

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Hays *et al.*
U.S. Patent No.: 5,659,891 Attorney Docket No.: 01048-21IP891
Issue Date: Aug. 19, 1997
Appl. Serial No.: 08/480,718
Filing Date: Jun. 7, 1995
Title: MULTICARRIER TECHNIQUES IN BANDLIMITED CHANNELS

DECLARATION OF DR. BEHNAAM AAZHANG

1. My name is Dr. Behnaam Aazhang, of Houston, Texas. I understand that I am submitting a declaration offering technical opinions in connection with the above-referenced *Inter Partes* Review proceeding pending in the United States Patent and Trademark Office for U.S. Patent No. 5,659,891 (“the ’891 patent”), and prior art references relating to its subject matter. My current *curriculum vitae* is attached and some highlights follow.

2. I have over thirty (30) years of experience in electrical and computer engineering in wireless communications with a focus on the interplay of communication systems and networks, including network coding, user cooperation, spectrum sharing, and opportunistic access. I attended the University of Illinois at Urbana-Champaign from 1979 to 1986, where I earned a Bachelor of Science, a Master of Science, and a Ph.D. in Electrical and Computer Engineering.

3. In 1985 I joined the faculty of Electrical and Computer Engineering at Rice University as an Assistant Professor. In 2001, I became the J. S. Abercrombie

Professor, at Rice University. At Rice, I have been teaching undergraduate courses in communication theory and systems, and developed a hands-on education laboratory for digital communications. I also teach graduate courses in the area of communication engineering, including wireless communications, random processes, detection and estimation theory, information and coding theory, spread spectrum communication systems, and topics in multiple access communications. In addition, I have received several NSF and NASA research grants, as well as being awarded numerous contracts with Texas Instruments, IBM, the State of Texas, National Instruments, the United States Air Force, and Nokia.

4. In 1997, I founded the Center on Multimedia Communications at Rice University, in Houston, Texas. From 1997 until 2005, I served as its Director where I supervised core faculty, graduate students, staff members, and managed a budget of more than \$4 million in annual research expenditures.

5. From 2004 to 2014, I served as the Chair of Electrical and Computer Engineering at Rice University where I supervised faculty, staff members, and graduate students, and managed a budget of more than \$4.5 million annual for operating costs and \$12 million annual external research funding.

6. From 2006 to 2013, I served as an Academy of Finland Distinguished Visiting Professor (FiDiPro) at the University of Oulu, in the Center for Wireless

Communication in Oulu, Finland, where I taught short courses on Cooperative Communications and on Understanding Wireless Networks.

7. In 2014, I became the Director of the Center for Neuro-Engineering, a multi-university research cluster within the Gulf Coast Consortium, which fosters collaboration among researchers and clinicians from Rice University, Baylor College of Medicine, The University of Texas Health Sciences, and The University of Houston. The Center for Neuro-Engineering is focused on an emerging field intersecting neuroscience and engineering.

8. Over the course of my career, I have authored and co-authored some three hundred (300) publications on various aspects of fixed and mobile communications, as noted in my curriculum vitae. My papers have been cited by other publications over 19,000 times and in 2003 I was recognized as a Thomson-ISI Highly Cited Researcher. In 2004, I received the IEEE Communication Society Stephen O. Rice Best Paper Award. I am a member of the Institute of Electrical and Electronics Engineers (IEEE) and actively involved in the Communications Society and the Information Theory Society of IEEE. I have served as the secretary and the treasurer of IEEE Information Theory Society. I am also a Fellow of IEEE and a fellow of American Association for the Advancement of Science (AASS). I was a commission member of the Mayor's Commission on

Cellular Towers from 1998 to 2004. I also served as a panelist for The National Science Foundation.

9. I have served as an editor for the IEEE and other publications. In 2007, I served as the editor of the KICS Journal of Communication and Network's Special Issue on Cooperative Communications. I also served as editor for the IEEE Journal on Selected Areas in Communication's Special Issue on Cooperation and Relay in December 2006, and the IEEE Transactions on Communications from 1993 to 1998. I have organized technical sessions in technical conferences, which included serving as the Publications Chair of the IEEE International Symposium on Information Theory, held in San Antonio, Texas in January 1993; the General Chair for the IEEE International Theory Symposium on Information Theory, held in Austin, Texas in June 2010; the IEEE Communication Theory Workshop, held in Dorado, Puerto Rico in May 2006, as well as the Third Annual Texas System Day Symposium, held in Texas in November 1989.

10. From 1996 to 2009, I was granted 13 patents as inventor or co-inventor.

11. From 1998 to the present, I have served as a consultant on a variety of cases all over the United States, including several patent infringement cases.

These cases involved Samsung, MOSAID, Wi-LAN, Marvell, Qualcomm, LG Inc., the City of Houston, Lockheed-Martin, WorldCom, Rockwell International,

Research and Development Laboratory, IBM Federal System Company, and Startek International Corp. In addition, I have served as a consultant on international litigation, including cases involving Nokia, in Finland, and ETRI, in Korea.

12. I have no financial interest in either party or in the outcome of this proceeding. I am being compensated for my work as an expert on an hourly basis. My compensation is not dependent on the outcome of these proceedings or the content of my opinions.

I. Scope of Assignment

13. I have been asked to provide my findings as to whether certain subject matter of the '891 patent is disclosed in certain references, including: (1) Dr. Rade Petrovic *et al.*, *Permutation Modulation for Advanced Radio Paging*, IEEE Proceedings of Southeastcon '93 (7 Apr. 1993) ("Petrovic"); (2) WIPO Publication No. 1989/008355 to Raith, *et al.* "Raith"); (3) C. Alakija and S. P. Stapleton, *A Mobile Base Station Phased Array Antenna*, 1992 IEEE International Conference on Selected Topics in Wireless Communications at 118 (Jun. 1992) ("Alakija"); and (4) Leonard J. Cimini, *Analysis and Simulation of a Digital Mobile Channel Using Orthogonal Frequency Division Multiplexing*, 33 IEEE Transactions on Communications 665 (Jul. 1985) ("Cimini"), from the perspective of a person of ordinary skill in the art of the '891 patent.

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.